

Serial No. 10/081,916

Re-submission of the Drawings

The attached replacement sheet(s) of drawings replace(s) the sheets with the corresponding figures. The replacement sheets include no changes, and are provided at the Examiner's request.

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Remarks

Claims 1-42 are pending in the application. Claim 23 has been amended herein. Favorable reconsideration of the application is respectfully requested.

I. ALLOWABLE SUBJECT MATTER

Applicant notes with appreciation the allowance of claims 1-21 and 35-38, and the indication that claim 31 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

II. DRAWINGS

The Examiner indicated that Figs. 7-11 have been partially cut off and that new complete copies of these drawings should be submitted along with this response. Applicant has included new copies of Figs 7-11 with this response. These drawings include no new matter.

III. REJECTION OF CLAIMS 22-27, 33-34 AND 39-40 UNDER 35 USC §103

a. Claims 22-27, 33-34 and 39-40

Claims 22-27, 33-34, and 39-40 stand rejected under 35 USC 103(a) as being unpatentable over IEEE article by Courtney et al. (A Hardware Architecture for Image Rectification and Ground Plane Obstacle Detection, IEEE, 1992, hereinafter Courtney) in view of U.S. Patent No. 6,608,923 to Zhang et al. (hereinafter Zhang). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Independent claims 22 and 39 recite that a shear component is calculated such that a final matrix is a combination of a *rotation and a translation and at least one internal camera parameter*. The Examiner admits that Courtney does not teach this feature. However, the Examiner contends that Zhang does teach this feature, and cites to the Abstract, column 6, lines 55-65 and Fig. 7 of Zhang.¹

The Abstract of Zhang simply states that affine transforms, which are used to compute two-dimensional projective transforms or homographies, can include a first transform and an optional second transform for image rectification. Fig. 7 illustrates that a shearing transform is used in determining the affine component of each

¹ Page 3, first full paragraph of the Office Action

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homography. The affine component can be based on images that are rotated and translated such that epipolar lines are horizontally aligned to satisfy the constraints for rectification. Neither the Abstract nor Fig. 7, however, have been found to teach or suggest that a final matrix is a combination of a rotation and a translation and at least one internal camera parameter, as recited in claims 22 and 39.

Further, column 6, lines 55-65 of *Zhang* state that if *intrinsic parameters of a camera are known, the images are calibrated*, and the fundamental matrix becomes the essential matrix. More importantly, however, the cited portion states that the invention is applicable to both calibrated or uncalibrated image pairs. In other words, the Invention disclosed in *Zhang* is applicable to systems wherein the intrinsic camera parameters are known (calibrated images) or unknown (uncalibrated images). Moreover, intrinsic camera parameters do not appear in any of the formulae of *Zhang*. Thus, it follows that the method of *Zhang* can be applied without knowledge of intrinsic camera parameters (e.g., uncalibrated images).

Further, *Zhang* has not been found to teach or suggest calculating the shear component such that a final matrix is a combination of a rotation, a translation and at *least one internal camera parameter*. This is logical, as the method of *Zhang* is applicable to uncalibrated images (images obtained without knowledge of intrinsic camera parameters) as well as calibrated images. Thus, intrinsic camera parameters are not required to implement the method of *Zhang*. *Zhang* also has not been found to teach or suggest how one would use intrinsic camera parameters to determine the transformations.

Accordingly, *Courtney* in view of *Zhang* has not been found to teach or suggest that a shear component is calculated such that a final matrix is a combination of a rotation and a translation and at least one internal camera parameter, as recited in claims 22 and 39.

Accordingly, withdrawal of the rejection of claims 22 and 39 is respectfully requested.

Claims 23-27, 33-34, and 40 directly or indirectly depend from claim 1 or claim 39 and, therefore, can be distinguished from the cited art for at least the same reasons.

Further, claim 23 has been amended to recite the step of using *statistical probability analysis* of the parameters of the stereoscopic image capture device. As

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was discussed in the previous Office Action, neither *Courtney* nor *Zhang* have been shown to teach or suggest the use of statistical probability analysis.

Accordingly, withdrawal of the rejection of claims 23-27, 33-34, and 40 is respectfully requested.

b. Claims 28-30, 32 and 41-42

Claims 28-30, 32 and 41-42 are rejected under 35 USC 103(a) as being unpatentable over *Courtney* and *Zhang* in further view of U.S. Patent No. 5,142,357 to *Lipton et al.* (hereinafter *Lipton*) and Applicant's admitted prior art (AAPA). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Claims 28-30 and 32 directly or indirectly depend from independent claim 22, while claims 41-42 directly or indirectly depend from independent claim 39. As discussed above, claims 22 and 39 can be distinguished from *Courtney* and *Zhang*.

Lipton is cited for teaching the use of a data processor and that a stereoscopic camera can be used for video or still images. Neither *Lipton* nor the AAPA, however, have been found to make up for the above-noted deficiencies of *Courtney* and *Zhang*. Thus, claims 22 and 39 can be distinguished from *Courtney*, *Zhang*, *Lipton* and the AAPA.

Since claims 28-30, 32 and 41-42 depend from one of the above independent claims, they can be distinguished from the cited art for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 28-30, 32 and 41-42 is respectfully requested.

IV. CONCLUSION

Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

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Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By 

Mark D. Saralino, Reg. No. 34,243

Kenneth W. Fafrak, Reg. No. 50,689

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
PH: (216) 621-1113
FAX: (216) 621-6165
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